



Naval Surface Fire **Support**



Overview Brief for

National Defense Industrial Association (NDIA) Fire Power Symposium and Exhibition



USS WINSTON S. CHURCHILL TRIAL BRAVO © BRIAN R. WOLFF / IPI. ALL RIGHTS RESERVED

PROGRAM MANAGER:
CAPT Herb Hause (PMS 529)

18 - 19 June 2002



MISSION STATEMENT: *“We design, build, modernize, and provide life-cycle support to gun, missile, and control systems that allow our surface combatants to provide responsive, lethal, and flexible fires to the land warriors.”*

MNS NSFS Requirements

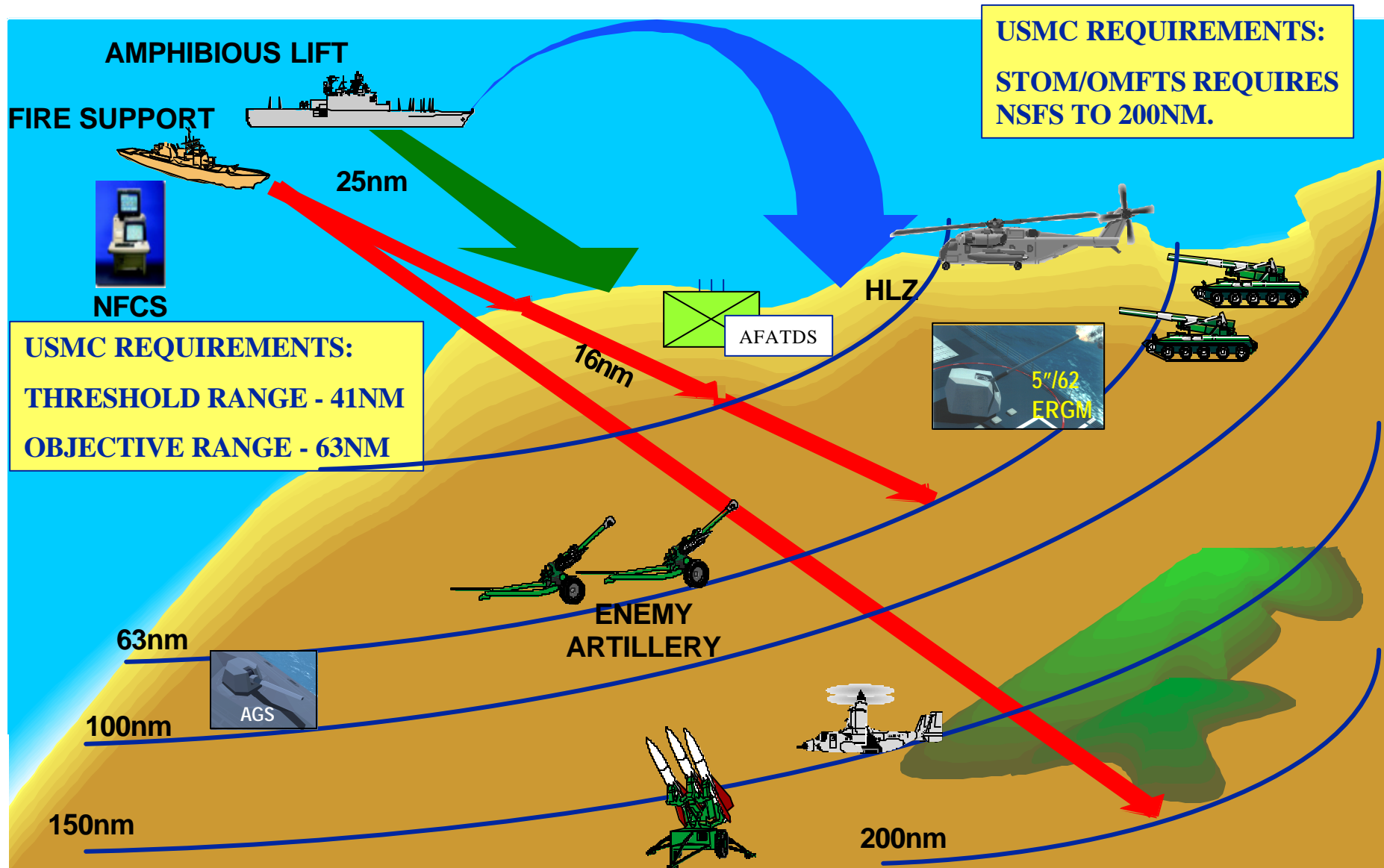
- **NSFS MNS Approved May 1992**
 - Requirement “for a combination of guns, rockets and missiles with sufficient range, accuracy and lethality to meet the wide range of requirements in support of NSFS, Amphibious Operations and the Joint Land Battle.”

NSFS Objectives:

- To provide supporting fire for amphibious assaults, raids, demonstrations or withdrawals.
- To provide suppression and/or destruction of hostile anti-shipping weapons and air defense systems.
- To delay and disrupt enemy movement and reinforcement of defending forces.

Kill of enemy reinforcements will be of primary importance.

NSFS Requirements

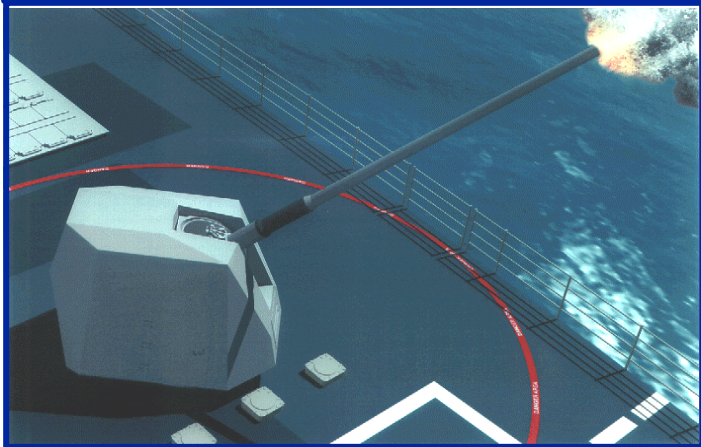




NSFS “System” Includes:

- Land Attack Doctrine and Concept of Employment
- Mission Planning and Coordination Tools
 - and Training
- Command, Control and Communications Capabilities
 - Interoperability
 - Situational Awareness
 - Surveillance and Targeting
 - Unit Status and Readiness
 - Mission Execution
- Family of Platforms and Munitions
 - Naval Guns
 - Conventional Gun Munitions
 - Precision Guided Munitions

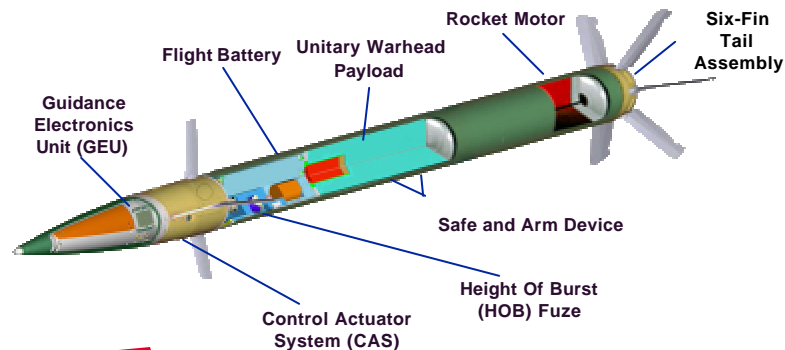
Mk 45 Mod 4 Gun (ACAT III)



Naval Surface Fire

Support

Extended Range Guided Munition - ERGM (ACAT II)



MK 160 MOD 8 Equipment Set

GCC
UYK-44 EP OSM
& EXP CAB



MK 27



GMCP



ADS-C&D
UYQ-70



NFCS (ACAT III)



Minimal Manning
Requirements

Propelling Charge

Mk 12 Mod X
Closure Plug



Ex 170 Electric Primer



Heat Shrink
Tubing



Ex 99
Propellant



Ex 98 Ignition
Material



Mk 9 Mod X
Flow Formed
Cartridge Case



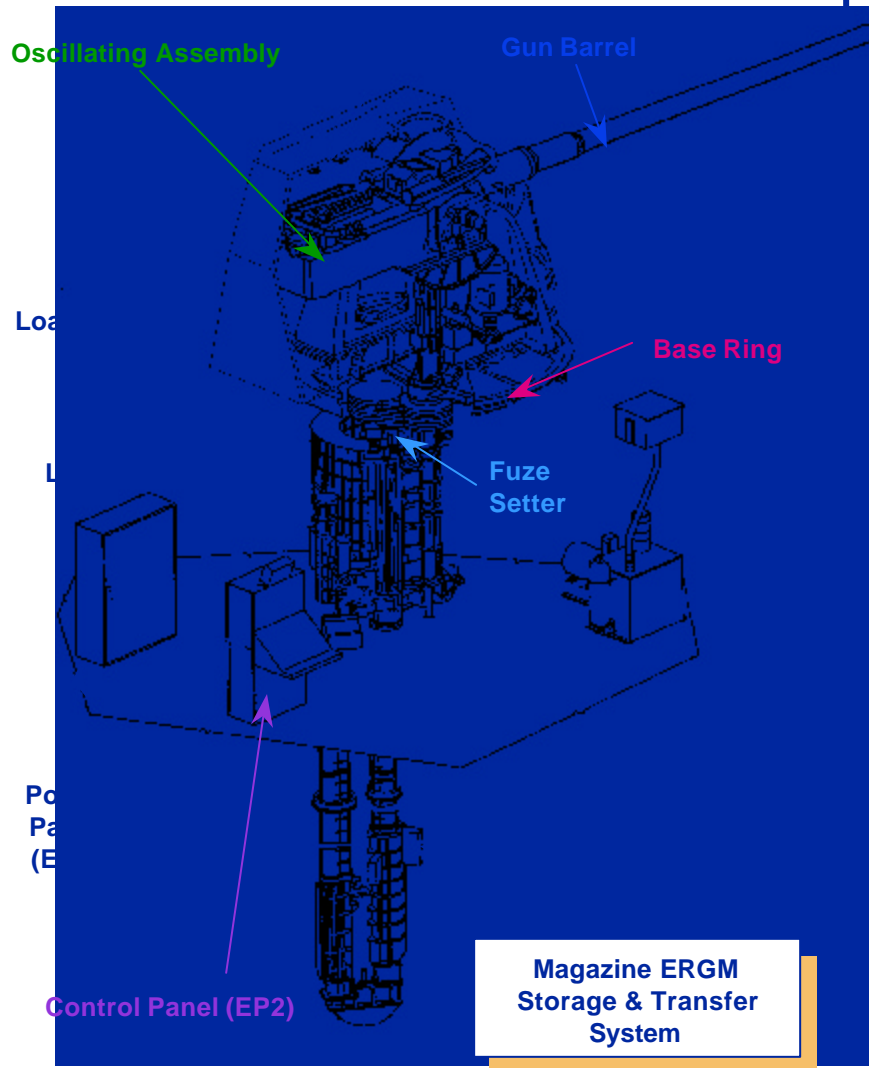
DDG 81



Conventional Munitions



NSFS MK 45 Mod 4 Modifications



Gun Barrel:

Lengthen to 62 calibers,
Increase service pressure from 55 to 65 kpsi
Increase Energy from 10MJ to 18MJ with new propellant charge

Oscillating Assembly:

Increase recoil stroke
Strengthen gun barrel housing
Incorporate multi-lug breech
New breech open/extractor control mechanism

Base Ring:

Incorporate stronger material

Fuze Setter:

Additional fuze setter for ERGM data

EP2 Panel:

Incorporate digital control
Incorporate ERGM interfaces

New Empty Case Tray:

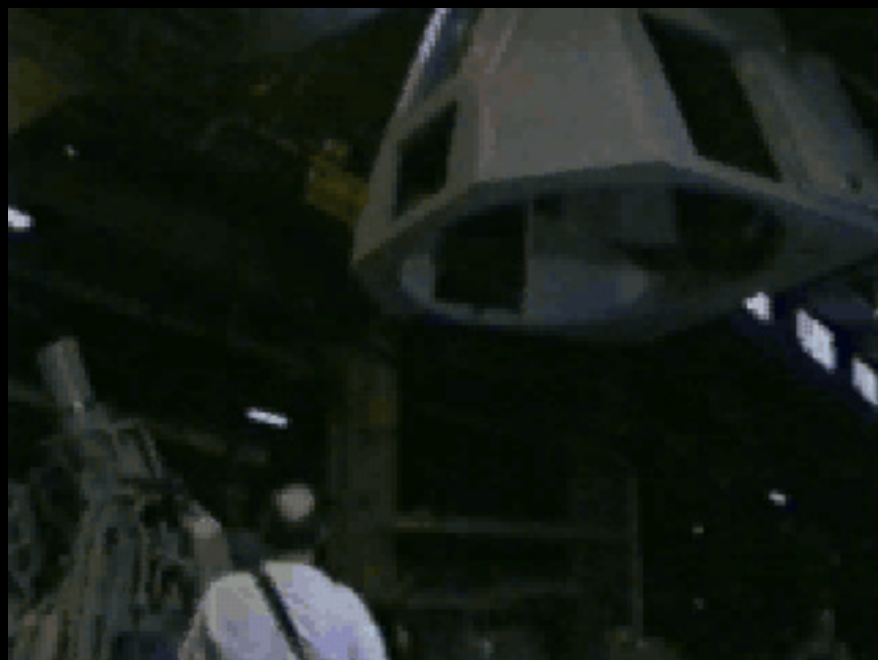
Redesign for longer recoil stroke

Modified Upper Hydraulics:

Accommodate changes to recoil system

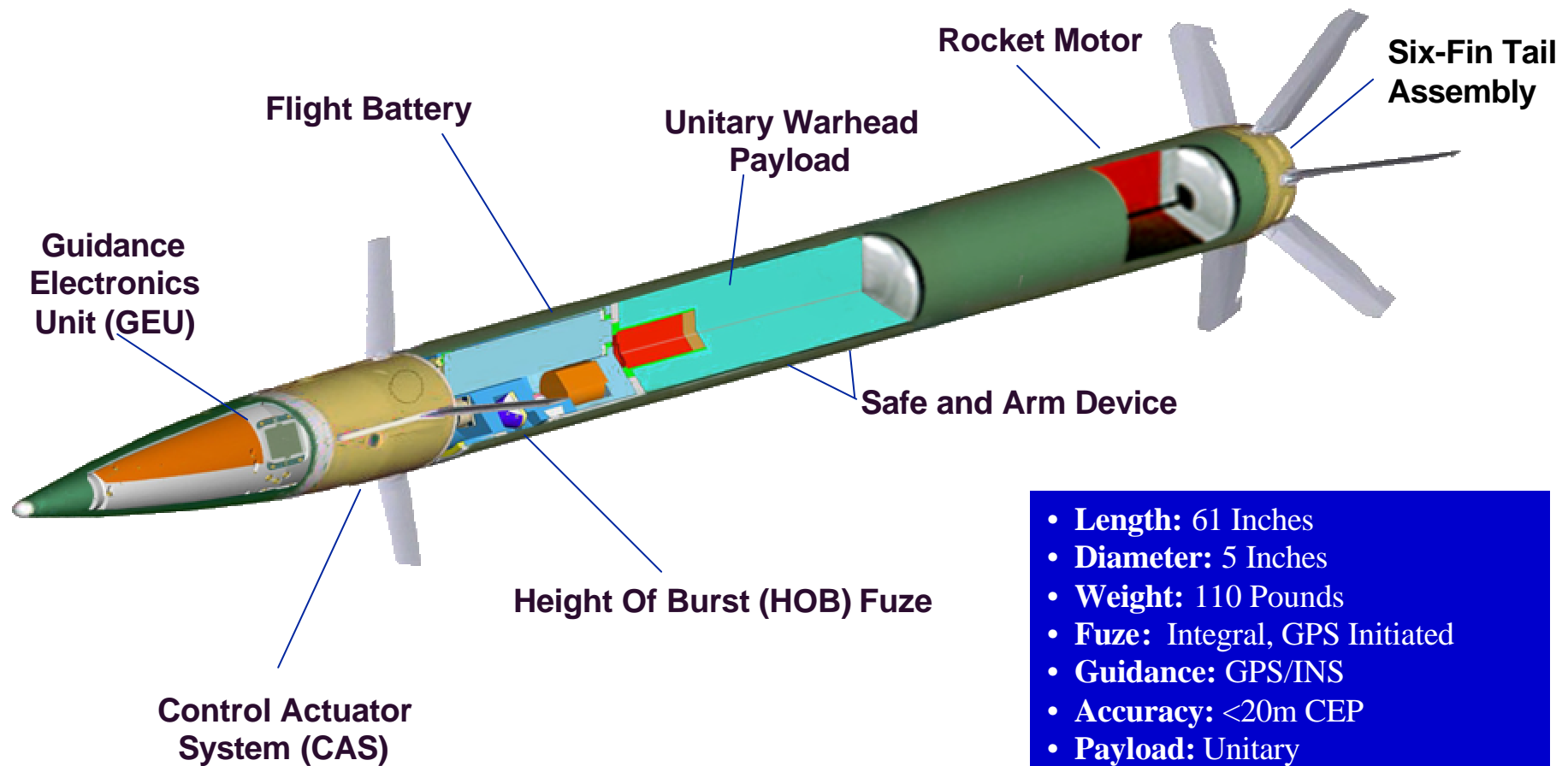
Elevation Drive:

Increased power to maintain current standards





Baseline ERGM Projectile



- **Length:** 61 Inches
- **Diameter:** 5 Inches
- **Weight:** 110 Pounds
- **Fuze:** Integral, GPS Initiated
- **Guidance:** GPS/INS
- **Accuracy:** <20m CEP
- **Payload:** Unitary
- **Propulsion:** Rocket Assisted
- **Range:** 13 to 63 Nautical Miles
- **Charge:** 18 Megajoule
- **Loading:** Double Ram

ERGM Flight Test Results (Jan 01) and (Dec 01) at White Sands Missile Range, AZ

- First ERGM Flight Demonstration Involving All-up Round (Control Test Vehicle-1) Conducted 31 January 01.
 - Firing Conditions
 - » 5,500g Gun Launch, 19.5 mi Range, 124 Second Flight Time
- All Primary Objectives Were Met.
 - Rocket Motor Ignition / Burn
 - TM Operation
 - Flight Battery Operation,
 - GEU Initialization / Operation,
 - Canard Cover Jettison & Canard Deployment
 - Tail Fin Deployment
- Second ERGM Flight Demonstration Involving All-Up-Round Conducted 10 December 01
- All Objectives Met:
 - Canard and Tail Fin Employment
 - Rocket Motor Ignition and Burn
 - 5-Card GEU Initialization and IMU Sensor Function
 - Telemetry Acquisition and Data Transmittal
 - Aerodynamic Stability Via Auto-Pilot
 - Operational Flight Software Performance was Excellent
 - GPS Acquisition and Track to Target
- Flight Specifics:
 - Time of Flight - 144 seconds
 - Apogee 46 Kft
 - Estimated Range at Impact - 20.5 Nautical Miles

System Description: What is the Naval Fires Control System (NFCS)?

- **NFCS is an automated Naval Surface Fires Mission Planning system to employ Naval Surface Fire Support (NSFS) Weapons... It Is Not a Fire Control System.**
- **NFCS is a System application that will receive targeting data, conduct naval surface fires mission planning and coordination, and execute fire missions via interfaces to weapon control systems.**
- **NFCS will be installed aboard DDG-51 (commencing with DDG-81) and CG-47 Cruiser Conversion.**



DDG



CG

FIRE MISSION/CFE



ATWCS / TTWCS



5"62 / ERGM

Naval Gunfire Support (Today)



BRIDGE



CIC

Firing Unit Manning (13 people)



(Tomorrow)

CIC



Firing Unit Manning (5 people)



- Automated NSFS Functions
- Full Digital Communications
- Automated Tactical Displays

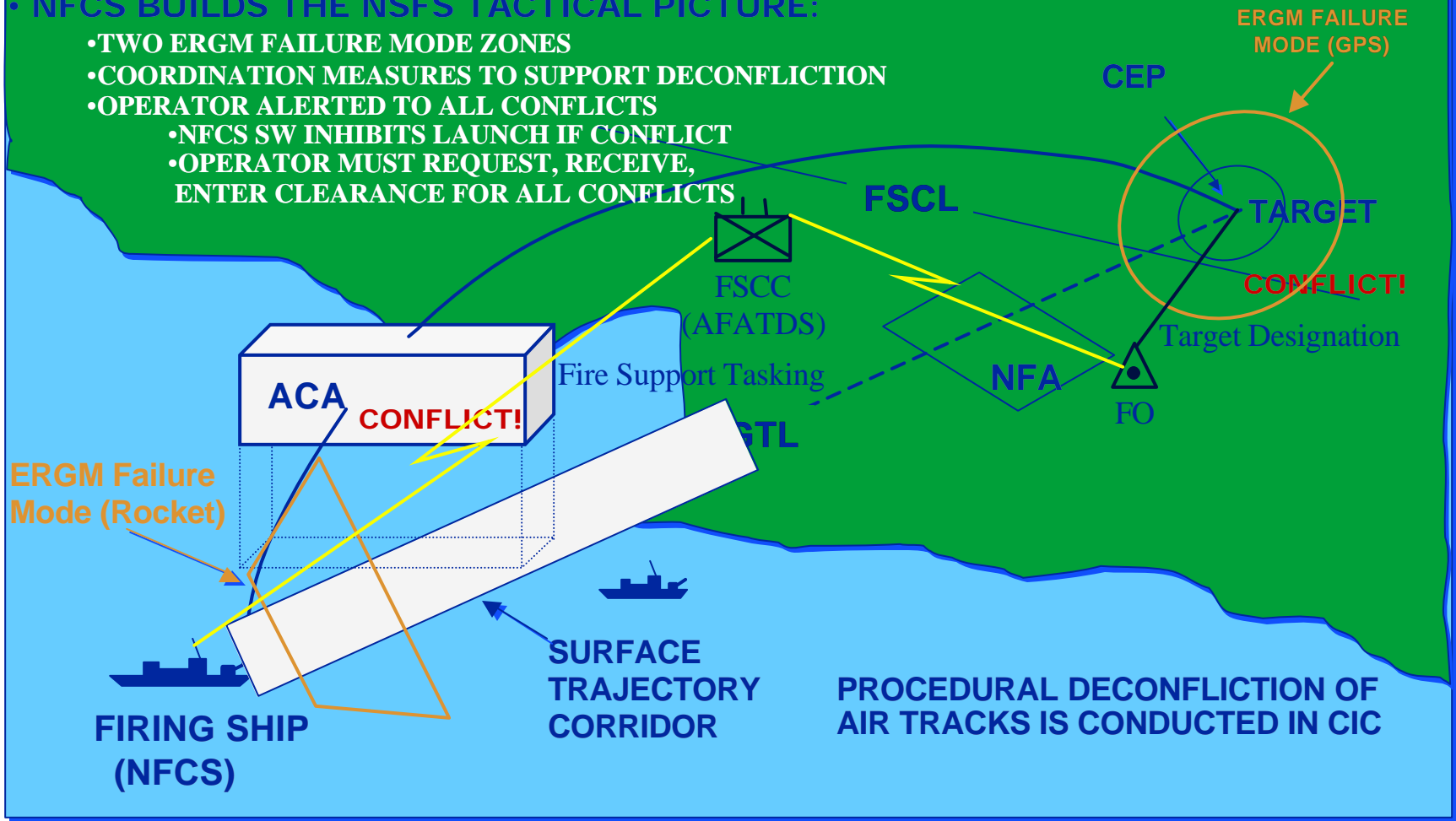
Reduced Manning

Naval Surface Fire Support

NFCS Approach for Gun Fires

- GUN TRAJECTORY COMPUTED BY GWS AND SENT TO NFCS
- NFCS BUILDS THE NSFS TACTICAL PICTURE:

- TWO ERGM FAILURE MODE ZONES
- COORDINATION MEASURES TO SUPPORT DECONFLICTION
- OPERATOR ALERTED TO ALL CONFLICTS
 - NFCS SW INHIBITS LAUNCH IF CONFLICT
 - OPERATOR MUST REQUEST, RECEIVE, ENTER CLEARANCE FOR ALL CONFLICTS



FSCL – Fire Support Coordination Line

NFA – No Fire Area

ACA – Airspace Coordination Area



Road Ahead

- Maintain Fielding Schedule for NSFS Programs
- Pursue Technology Demonstration Programs
 - Low-Cost Guidance Effort - Draper
 - Extended Range Munition (ERM) - ATK
- Continue Commonality Efforts with Army
 - Hardware / Software
 - Common Target Sets and Lethality Models / Explosive Fills
 - Common Procurement Strategies
 - Low-Cost Guidance Electronics Efforts

**GOAL: Significant New and Affordable Capabilities
for the Warfighter.**